

ENVIRONMENTAL SCIENCE

Bachelor of Science degree with a major in Environmental Science

— with concentrations in Ecological Restoration, Energy & Climate, Environmental Policy, and Geospatial Science

Minor in Ecological Restoration

Minor in Environmental Policy

Department Chair

Steven R. Martin, Ph.D.

Environmental Science & Management

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Sabra Steinberg,

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The Program

Students completing this program will have demonstrated:

- understanding of essential biological, chemical, and physical processes
- understanding of the policy, economic, and social implication of many environmental issues
- skills of analysis necessary to understand and predict the consequences of human action on the physical, biological, and cultural world
- the ability to examine and understand the requirements needed to achieve environmental conservation for a sustainable society
- writing, speaking, and electronic communication skills needed to communicate

with the public and professionals concerning the environmental sciences

- critical thinking skills as the basis for decision making and sound value judgments
- teamwork, leadership, and conflict resolution skills.

Within the program, the Environmental Policy concentration trains students to understand and address environmental issues in their political, social, and scientific context, designing policies that balance our need for resources with our need to conserve the environment. The Ecological Restoration concentration emphasizes renewing degraded, damaged, or destroyed ecosystems through active human intervention, reestablishing ecological integrity and sustainability by restoring native species and ecological linkages. Students in the Energy and Climate concentration are provided a foundation in climate change-related sciences, as well as knowledge in important concepts related to the ways we produce and use energy.

Potential careers: graduates should find work with state, federal, and local governments, nonprofit conservation organizations, private sector consulting firms (particularly those dealing with environmental impact analysis, wetlands delineation, environmental restoration, and natural resource management), or go on to professional and graduate schools to study ecology, soils, watershed management, law, political science, public administration, or environmental policy.

Preparation

High school students need strong academic preparation in math, writing, and the sciences.

REQUIREMENTS FOR THE MAJOR

For a description of degree requirements to be fulfilled in addition to those listed below for the major, please see "The Bachelor's Degree" section of the catalog, pp. 61-77, and "The Master's Degree" section of the catalog, pp. 78-80.

Complete all courses in the major with a C- or better:

Core

- EMP 105 (3) Natural Resource Conservation
- ENVS 110 (3) Intro to Environmental Science
- ENVS 111 (1) Environmental Science Seminar

- GSP 101/GSP 101L (2/1) Geospatial Concepts and Lab
- GSP 270 (3) Geographic Information Science (GIS)
- ENVS 220 (3) Intro to Environmental Policy
- ENVS 230 (3) Environmental Problem Solving
- ENVS 301/GEOG 301 (3) International Environmental Issues & Globalization
- ENVS 410 (3) Environmental Science Practicum, **or**
- ENVS 411 (3) Sustainable Campus
- EMP 425 (3) Environmental Impact Assessment
- EMP 435 (2) Grant Proposal Writing

Ecological Restoration Concentration

Complete all courses in the major with a C- or better:

Core courses plus:

Lower Division

- CHEM 107 (4) Fundamentals of Chemistry
- BIOL 105 (4) Principles of Biology
- BOT 105 (4) General Botany
- SOIL 260 (3) Intro to Soil Science
- STAT 109 (4) Introductory Biostatistics

Upper Division

- BIOL 330 (4) Principles of Ecology, **or**
- BOT 330/BOT 330L (2/1) Plant Ecology and Lab, **or**
- FOR 131 (3) Forest Ecology, **or**
- RRS 370 (3) Wildland Ecology Principles, **or**
- WLDF 301 (3) Principles of Wildlife Management
- EMP 305 (3) Environmental Conflict Resolution, **or**
- EMP 309B (3) Environmental Communication
- RRS 306 (3) Wildland Resource Principles
- WSHD 310 (4) Hydrology & Watershed Management
- ENVS 350 (3) Principles of Ecological Restoration
- BOT 350 (4) Plant Taxonomy
- SOIL 363 (3) Wetland Soils, **or** upper division soils course approved by advisor
- EMP 400 (3) Inscape & Landscape, **or**

- FOR 400 (3) Forestry in Modern Society, **or**
 WLDF 302/PHIL 302 (3) Environmental Ethics
 FISH 470 (3) River Fish Restoration Ecology [Prereq: FISH 310], **or**
 FOR 431 (3) Forest Restoration, **or**
 RRS 430 (3) Wildland Restoration & Development
 ENVS 450 (3) Applied Ecological Restoration

Choose two of the following:

- EMP 420 (3) Ecosystem Analysis
 FISH 320/FISH 320L (3/1) Limnology and Practicum
 FISH 476 (3) Ecology of Running Waters
 FOR 315 (3) Forest Management
 FOR 430 (3) Forest Ecosystems
 GEOL 306 (3) General Geomorphology
 SOIL 360 (3) Origin & Classification of Soils
 WLDF 430 (3) Ecology & Management of Wetland Habitats for Wildlife
 WLDF 431 (3) Ecology & Management of Upland Habitats for Wildlife
 WLDF 460 (3) Conservation Biology

NOTE: 24 units double-count toward GE requirements.

Energy & Climate Concentration

Complete all courses in the major with a C- or better.

Core courses plus:

Lower Division

- BOT 105 (4) General Botany, **or**
 BIOL 105 (4) Principles of Biology
 MATH 105 (3) Calculus for the Biological Sciences & Natural Resource
 ECON 104 (3) Contemporary Topics in Economics
 CHEM 107 (4) Fundamentals of Chemistry
 OCN 109/109L (3/1) General Oceanography/Lab
 PHYX 106 (4) College Physics: Mechanics & Heat
 PHYX 107 (4) College Physics: Electromagnetism & Modern Physics
 STAT 109 (4) Introductory Biostatistics

Upper Division

- ENGR 305 (3) Appropriate Technology
 BIOL 330 (4) Principles of Ecology, **or**

- WLDF 301 (3) Principles of Wildlife Management
 EMP 305 (3) Environmental Conflict Resolution, **or**
 EMP 309B (3) Environmental Communication
 ENGR 371 (3) Energy Systems & Technology
 ENVS 370 (3) Energy, Technology & Society
 CHEM 370 (3) Earth System Chemistry
 EMP 400 (3) Inscape & Landscape
 OCN 420 (3) Oceans and Climate
 WSHD 458 (3) Climate Change & Land Use
 ECON 450 (4) Energy Economics & Climate Policy

NOTE: 27 units double-count toward GE requirements.

Environmental Policy Concentration

Complete all courses in the major with a C- or better.

Core courses plus:

Lower Division

- FOR 100 (3) Critical Thinking and Social & Environmental Responsibility
 ECON 104 (3) Contemporary Topics in Economics
 CHEM 107 (4) Fundamentals of Chemistry
 BOT 105 (4) General Botany, **or**
 BIOL 105 (4) Principles of Biology
 STAT 108 (4) Elementary Statistics, **or**
 STAT 109 (4) Introductory Biostatistics
 EMP 210 (3) Public Land Policy

Upper Division

- EMP 305 (3) Environmental Conflict Resolution
 EMP 309B (3) Environmental Communication
 EMP 325 (3) Environmental Law & Regulation
 PHIL 302/WLDF 302 (3) Environmental Ethics
 ECON 309 (3) Economics of a Sustainable Society, **or**
 ENGR 308 (3) Technology & the Environment
 BIOL 330 (4) Principles of Ecology, **or**
 WLDF 301 (3) Principles of Wildlife Mgmt.
 NAS 332 (3) Environmental Justice
 EMP 400 (3) Inscape & Landscape
 ECON 423 (3) Environmental & Natural Resource Economics
 EMP 430 (3) Natural Resource Mgmt. in Protected Areas

Choose three of the following, or course(s) approved by Advisor:

- EMP 462 (3) Coastal & Marine Planning
 FISH 220 (3) Water Resources & Conservation
 NAS 331 (3) Indigenous Natural Resource Management Practices
 NAS 364 (4) Federal Indian Law I
 NAS 366 (3) Tribal Water Rights
 PSCI 317 (1-4) Topics in Public Policy
 PSCI 352 (4) Water Politics
 PSCI 358 (4) Political Advocacy
 PSCI 360 (4) Political Economy
 PSCI 364 (4) Technology & Development
 PSCI 365/GEOG 365 (4) Political Ecology
 PSCI 373 (4) Politics of Sustainability
 PSCI 412 (4) Legal Research

NOTE: 30 units double-count toward GE requirements.

Geospatial Science Concentration

Complete all courses in the major with a C- or better.

Core courses plus:

Lower Division

- GEOG 106 (3) Physical Geography
 STAT 109 (4) Introductory Biostatistics
 GSP 216 (3) Intro to Remote Sensing

Upper Division

- GSP 316 (4) Cartography
 GSP 318 (3) Geospatial Programming I
 GSP 326 (3) Intermediate Remote Sensing
 GSP 330 (3) Mobile Mapping
 GSP 370 (3) Intermediate GIS
 EMP 305 (3) Environmental Conflict Resolution, **or**
 EMP 309B (3) Environmental Communication
 GSP 436 (3) Advanced Remote Sensing, **or**
 GSP 470 (3) Advanced GIS
 ENVS 482 (1-3) Environmental Science Internship

Choose two of the following, or course(s) approved by Advisor; minimum six units:

- EMP 325 (3) Environmental Law & Regulation
 EMP 360 (3) Intro to Natural Resource Planning Methods
 EMP 430 (3) Natural Resource Mgmt. in Protected Areas
 FISH 220 (3) Water Resources & Conservation
 FISH 260 (3) Fish Conservation & Mgmt.

- FISH 300 (3) Intro to Fishery Biology
 FOR 302 (3) Forest Ecosystems & People
 FOR 307 (3) CA's Forests & Woodlands
 GEOL 300 (3) Geology of California
 GEOL 303 (3) Earth Resources & Global Environmental Change
 GEOL 306 (3) General Geomorphology
 GEOL 308 (3) Natural Disasters
 OCN 301 (3) Marine Ecosystems — Human Impact
 OCN 304 (3) Resources of the Sea
 RRS 306 (3) Wildland Resource Principles
 WSHD 310 (4) Hydrology & Watershed Management
 WSHD 333 (3) Wildland Water Quality
 WLDF 301 (3) Principles of Wildlife Mgmt.

NOTE: 21 units double-count toward GE requirements.

REQUIREMENTS FOR THE MINORS

Ecological Restoration Minor

Required Courses

- BOT 105 (4) General Botany
 SOIL 260 (3) Intro to Soil Science
 ENVS 350 (3) Principles of Ecological Restoration

Choose one restoration course:

- FISH 470 (3) River Fish Restoration Ecology
 FOR 431 (3) Forest Restoration
 RRS 430 (3) Wildland Restoration & Development

Choose one of the following elective courses (or course approved by ENVS Program Coordinator):

- BIOL 330 (4) Principles of Ecology
 BOT 330/BOT 330L (2/1) Plant Ecology and Lab
 BOT 350 (4) Plant Taxonomy
 EMP 420 (3) Ecosystem Analysis
 FISH 310 (4) Ichthyology
 FISH 320 (3) Limnology
 FISH 476 (3) Ecology of Running Waters
 FOR 130 (3) Dendrology
 FOR 321 (3) Fire Ecology
 FOR 430 (3) Forest Ecosystems
 GEOL 306 (3) General Geomorphology
 RRS 306 (3) Rangeland Resource Principles
 SOIL 360 (3) Origin & Classification of Soils
 SOIL 363 (3) Wetland Soils
 WLDF 301 (3) Principles of Wildlife Mgmt.
 WLDF 430 (3) Ecology & Management of Wetland Habitats for Wildlife

- WLDF 460 (3) Conservation Biology
 WSHD 310 (4) Hydrology & Watershed Management

Environmental Policy Minor

Required Courses

- ENVS 110 (3) Intro to Environmental Science
 ENVS 220 (3) Intro to Environmental Policy
 EMP 210 (3) Public Land Use & Policy
 EMP 325 (3) Environmental Law & Regulation
 EMP 425 (3) Environmental Impact Assessment

Plus one of the following:

- ECON 423 (3) Environmental & Natural Resource Economics
 NAS 332 (3) Environmental Justice
 PSCI 317 (1-4) Topics in Public Policy
 PSCI 352 (4) Water Politics
 PSCI 364 (4) Technology & Development
 PSCI 373 (4) Politics of Sustainability
 PSCI 412 (4) Legal Research
 WSHD 430 (3) Water Rights/Water Law

